Multiple Hierarchies: Another Perspective on Prolongation

Edward Pearsall

Introduction

One of the most influential concepts to emerge in twentieth-century music-theoretical discourse is that of prolongation. Prolongational theories are based on the idea that certain pitches dominate a time-span longer than their actual duration in music. Furthermore, in most prolongational theories, prolonged pitches are assigned to various levels in a theoretical hierarchy of pitch prominence. One would think that these pitches are somehow related. Because each hierarchic level spans an entire piece, however, pitch events that occur at quite disparate locations often appear on the same level; it is sometimes difficult to see how these pitches are, in fact, related. On the other hand, some pitches do seem to exert more prominence than others within some contexts. This issue, then, may warrant another look.

In this paper, I will discuss cognitive ramifications of nonadjacent melodic connections and suggest ways that prolongation can be accounted for without relying so heavily on level analysis. In order to clarify these ideas, I will introduce a theory of "multiple hierarchies" based on two current and well-known theories of music cognition: schema theory and Fred Lerdahl and Ray Jackendoff's *Generative*

Theory of Tonal Music.[1] These theories suggest that our perception of music is both schematic and tree-like: schematic because we often organize music according to melodic gestures, and tree-like because we tend to arrange pitches hierarchically. Combining trees with schemas provides a way to illustrate hierarchical relations among schematic pitch-events and also demonstrates that hierarchies of pitch prominence are confined to the duration of a schema. In this approach pitches manifest their prominence or subordinance only with regard to the schema they are associated with.[2] Hence, pitches will only be prolonged across time-spans defined by schematic boundaries. Rather than one hierarchy spanning an entire piece, then, there are multiple hierarchies, one for each schematic context. To develop my ideas on this subject, I will first review traditional perspectives on prolongational hierarchies. Following this, I will discuss trees and schemas as separate analytical representations of music cognition and finally suggest a way to illustrate multiple hierarchies by combining trees with schemas.

Prolongational Hierarchies

Level Analysis

That Schenker's most well-known work, *Der freie Satz*, involves a theory of levels has been attested to by a number of authors. Allen Forte notes, for instance, that "the bases of Schenker's concept of structural levels, upon which his theory of levels rests, are not to be

---

[1]Schemas, sometimes referred to as gestures, are discussed in detail by Deryck Cooke in *The Language of Music* (London: Oxford University Press, 1959) and by Leonard B. Meyer in *Explaining Music: Essays and Explorations* (Berkeley: University of California Press, 1976). Robert Gjerdingen conducts a careful and precise investigation of the changing-note schema in *A Classic Turn of Phrase* (Philadelphia: University of Pennsylvania Press, 1988). Fred Lerdahl and Ray Jackendoff lay out their ideas in *A Generative Theory of Tonal Music* (Cambridge: MIT Press, 1983).

[2]In this paper, I will use the neologism, "subordinance," because it bears a closer resemblance to the words I use in opposition to it, "prominence" and "dominance," and to avoid its awkward correlate, "subordinateness."

found in abstruse speculation, or in acoustical or metaphysical formulations (although Schenker was not averse to these), but in the organization of music itself.''[3] Forte's assessment centers the discussion of levels—appropriately, I believe—on musical structure: levels reflect the structure of music, its inherent organizational properties. Schenker distributes musical content into several levels: (1) a single background level characterized by a descent from $\hat{3}$ or $\hat{5}$ (less often $\hat{8}$) to $\hat{1}$, (2) several middleground levels in which more and more content is added to the background, and (3) a single foreground level, which approximates the actual musical surface. The foreground and background are easy enough to obtain in such a theory; the foreground is substantiated by the notation, the background by Schenker's word. The problem that remains, as David Beach points out, is ''determining which events belong to a particular structural level'' in the middleground.[4] Several authors—most notably Maury Yeston, Carl Schachter, and Arthur Komar—rely explicitly on rhythm and meter for determining the structural importance of pitch events in a piece. Komar extends the metrical organization of a piece to rather large musical spans and shows how the events on a particular structural level occur at relatively strong positions in this large-scale metrical structure.[5] For Yeston, structural events manifest rhythm, not meter, when grouped together. Thus, ''there is apparently . . . no such thing as a level of meter or a level on which meter may appear; but rather meter is an

---

[3]Allen Forte, ''Schenker's Conception of Musical Structure,'' *Journal of Music Theory* 3, no. 1 (1959): 4.

[4]David Beach, ''Schenker's Theories: A Pedagogical View,'' in *Aspects of Schenkerian Theory*, ed. David Beach (New Haven and London: Yale University Press, 1983), 27.

[5]Arthur Komar, *Theory of Suspensions: A Study of Metrical Pitch Relations in Tonal Music* (Princeton: Princeton University Press, 1971), 51-52. Komar's ideas have much in common with Edward T. Cone's concept of hypermeasures, measures that group together under a metrical structure whose structural downbeats, while periodic, are spaced farther apart than those in the notated meter. See Edward T. Cone, *Musical Form and Musical Performance* (New York: Norton, 1968), 40.

outgrowth of the interaction of two levels—two differently-rated strata, the faster of which provides the elements and the slower of which groups them.''[6] According to this perspective, meter—representing pulse and accent—is at best *implied* by the rhythm of the pitch events on some level. There is some question as to whether depending on middleground rhythms for assigning pitches to levels has any merit whatsoever. As Schachter notes, ''rhythmic notation [in reductions] makes it more difficult to show structural levels and, in general, makes voice leading harder to perceive.''[7] Both Schachter and Yeston conclude that neither rhythm nor meter, either alone or together, constitute a firm enough foundation for assigning pitches to levels. Rather, both find that rhythm and meter in conjunction with other contextual attributes such as timbre, density, dynamics, duration, and tonal stability indicate how pitches form levels.

Perhaps the identification of hierarchical levels and their pitches is more arbitrary than some would like it to be. Beach notes, for instance, that ''Schenker was, in fact, quite consistent in using notational symbols [in *Der freie Satz*] but flexible in his interpretation of what constitutes the foreground, middleground, and background.''[8] Schenker's own view on the subject is that ''it is impossible to generalize regarding the number of structural levels, although in each individual instance the number can be specified exactly."[9] For Schenker, then, each piece generates its own unique series of levels. I would go further and suggest that each piece generates its own melodic gestures and that ultimately these gestures determine a pitch's structural importance and consequently its structural level. This position

---

[6]Maury Yeston, *The Stratification of Musical Rhythm* (New Haven and London: Yale University Press, 1976), 66.

[7]Carl Schachter, ''Rhythm and Linear Analysis: Durational Reduction,'' in *The Music Forum*, vol. 5, ed. Felix Salzer (New York: Columbia University Press, 1980), 232.

[8]Beach, ''Schenker's Theories: A Pedagogical View,'' 28.

[9]Heinrich Schenker, *Free Composition* [1935], trans. Ernst Oster (New York: Longman, 1979), 26.

parallels that of Komar who advocates "monitoring initial materials through successive stages of repetition and transformation" in order to obtain an idea of the motivic organization of a piece.[10] Komar urges us to examine significant gestures in consecutive order (i.e., "through successive stages of repetition and transformation"), constructing higher levels from the way those gestures group together in the music. I will adopt such an approach when I develop my ideas regarding multiple hierarchies. Before turning to this task, however, I believe it would be helpful to examine prolongation and its impact on level analysis.

Prolongation and Level Analysis

Underlying the theory of levels is what is commonly known as "prolongation." This concept is often misunderstood and therefore requires some explanation. I can find no better description of prolongation than the following one given by Schenker:

> The first $\hat{3}$, which is the primary tone of the total fundamental line $\hat{3}$-$\hat{1}$, although not expressly retained [i.e., prolonged], is taken up again by the second $\hat{3}$, as primary tone of the resumed linear progression which now leads to $\hat{1}$. The actual retention of a primary tone (in order to make the inner connection quite apparent) would conflict with the nature of diminution, which requires motion. Thus, the primary tone combines within itself a mental retention, that is, a motionless state, and an actual motion of the linear progression—an invaluable source of compositional technique.[11]

In this description, Schenker points out how prolonged pitches, which remain in a metaphorically motionless state, are elaborated (Schenker

---

[10]Arthur Komar, "Derivational Analysis Step by Step," *Journal of Music Theory Pedagogy* 1, no. 2 (1987): 149.

[11]Schenker, *Free Composition*, 38.

uses the term *diminution*) by foreground events. The effect, then, is of a prolonged pitch remaining prominent while other, less prominent, pitches elaborate it.

To the extent that some pitches consistently dominate others in a prolongational time-span, all of the pitches in that time-span can be arranged according to a graded series of prominence—in short, a hierarchy. A prolongational hierarchy, then, is a structure that represents the prominent or subordinate status of pitches in a time-span. In generative theories of music, some pitches in a composition are thought to remain hierarchically prior throughout relatively long time-spans. Fred Lerdahl puts it this way: "an event hierarchy . . . is part of the structure that listeners infer from temporal musical sequences."[12] Lerdahl's ideas are consistent with those of Wallace Berry, who notes that a hierarchic structure "is *not* specific to the contextual *ordering* of materials in a piece; rather, the appropriate schematic-illustrative arrangement of materials is laid out as to hierarchic rather than temporally disposed sequences."[13] In other words, regardless of how pitches occur sequentially in a piece, the listener interprets them according to a hierarchy of prominence that is itself fixed and nonsequential. In this way, hierarchies are like immovable architectural structures that guide the temporal unfolding of a composition. Schenker's approach is essentially the same. He suggests that there is one *Ursatz* or "fundamental structure" that underlies all well-composed tonal pieces. For Schenker, the events of the *Ursatz* dominate all other events in a composition and are prolonged by means of melodic elaboration (arpeggiations, neighbors, etc.)—in short, any technique that extends the music forward in time without essentially changing the prominence of the prolonged pitch and its harmonic

---

[12]Fred Lerdahl, "Tonal Pitch Space," *Music Perception* 5, no. 3 (1988): 316.

[13]Wallace Berry, "On Structural Levels in Music," *Music Theory Spectrum* 2 (1980): 25-26.

underpinnings.[14] If not itself a hierarchy, the *Ursatz* gives rise to the notion that certain pitches in a composition have hierarchical priority over others. Musical hierarchies, then, are repositories for prominence/subordinance relations among notes and, while formed from and manifested in musical events that unfold temporally, do not themselves have a temporal dimension.

Others have argued that because pitches change status from one moment to the next, they occupy first one level then another as a piece progresses. Eugene Narmour stipulates, for example, that "when uniqueness is a crucial property of a given pitch on a lower level that is transformed to higher level, then the uniqueness is embodied in that tone and stays with it as it moves to the higher level."[15] For Narmour, the hierarchical status of a pitch ought to remain fixed and immovable throughout the context to which that hierarchy pertains. Because pitches change status from moment to moment, however, a pitch may occupy one hierarchical level through a span of prolongation where it also occupies another level. This can create a conflict between a pitch's hierarchical status in broad contexts and its status in local contexts. Narmour reacts to this perspective by giving us no option for hearing prolongations of any kind, a position that seems undesirable given the likelihood that we group at least a few notes at a time into gestures, where some notes are more prominent than others. I will adopt a less extreme position by suggesting that while we can hear certain pitches as being prolonged, prolonged pitches do not necessarily occupy predetermined levels in a single hierarchy that exists for the entire duration of a piece. Rather, we interpret pitches in terms of different hierarchies that succeed one another in the musical flow.

---

[14]Schenker puts it this way: "The life of the fundamental line and the bass arpeggiation . . . expands through the middleground, through what I have called the voice-leading and transformation levels, prolongations, elaborations, and similar means, into the foreground." (*Free Composition*, 6).

[15]Eugene Narmour, "Some Major Theoretical Problems Concerning the Concept of Hierarchy in the Analysis of Music," *Music Perception* 1, no. 2 (1983): 137.

A Theory of Multiple Hierarchies

In order to illustrate how listeners might organize music according to different hierarchies as they listen to music, I propose a method of analysis that divides music into separate hierarchical contexts. This method is based on a theory of multiple hierarchies whereby music is grouped into melodic gestures—I will call them melodic schemas—whose pitches conform to a hierarchy of prominence and subordinance that is limited to the duration of the schema. In a multiple hierarchical approach to analysis, each schema maintains some autonomy in perception, allowing listeners to group pitches into different schemas as they listen to a piece. By remaining autonomous, each schema generates a hierarchy of prominence/subordinance that does not transcend schematic boundaries. Such an approach can perhaps help to mitigate some of the intense analytical vexation that arises when trying to determine the structural level a pitch belongs to by confining the span of a pitch's prominence to the span of the schema of which it is a part, rather than by attempting to find a pitch's exact level in an hypothetical hierarchy that spans an entire piece.

Analysis with Trees and Schemas

As I have noted, some pitches dominate others in certain contexts; in these cases, listeners probably organize pitches hierarchically. Lerdahl and Jackendoff illustrate this phenomenon by segmenting music into time-spans and using trees to show hierarchical relations in each segment. For Lerdahl and Jackendoff, "metrical and grouping structures . . . offer a principled way of segmenting a piece into domains of elaboration at every level—a hierarchy of time-spans." Furthermore, "grouping and metrical components serve a double function in constructing reductions: they segment the music into rhythmic domains, and within these domains they provide rhythmic criteria to supplement pitch criteria in the determination of the structural importance of events."[16] Thus, prominent and subordinate

[16]Lerdahl and Jackendoff, 119.

relations among pitch events are maintained within time-span domains, domains determined by harmony, grouping structures, and metrical structures.

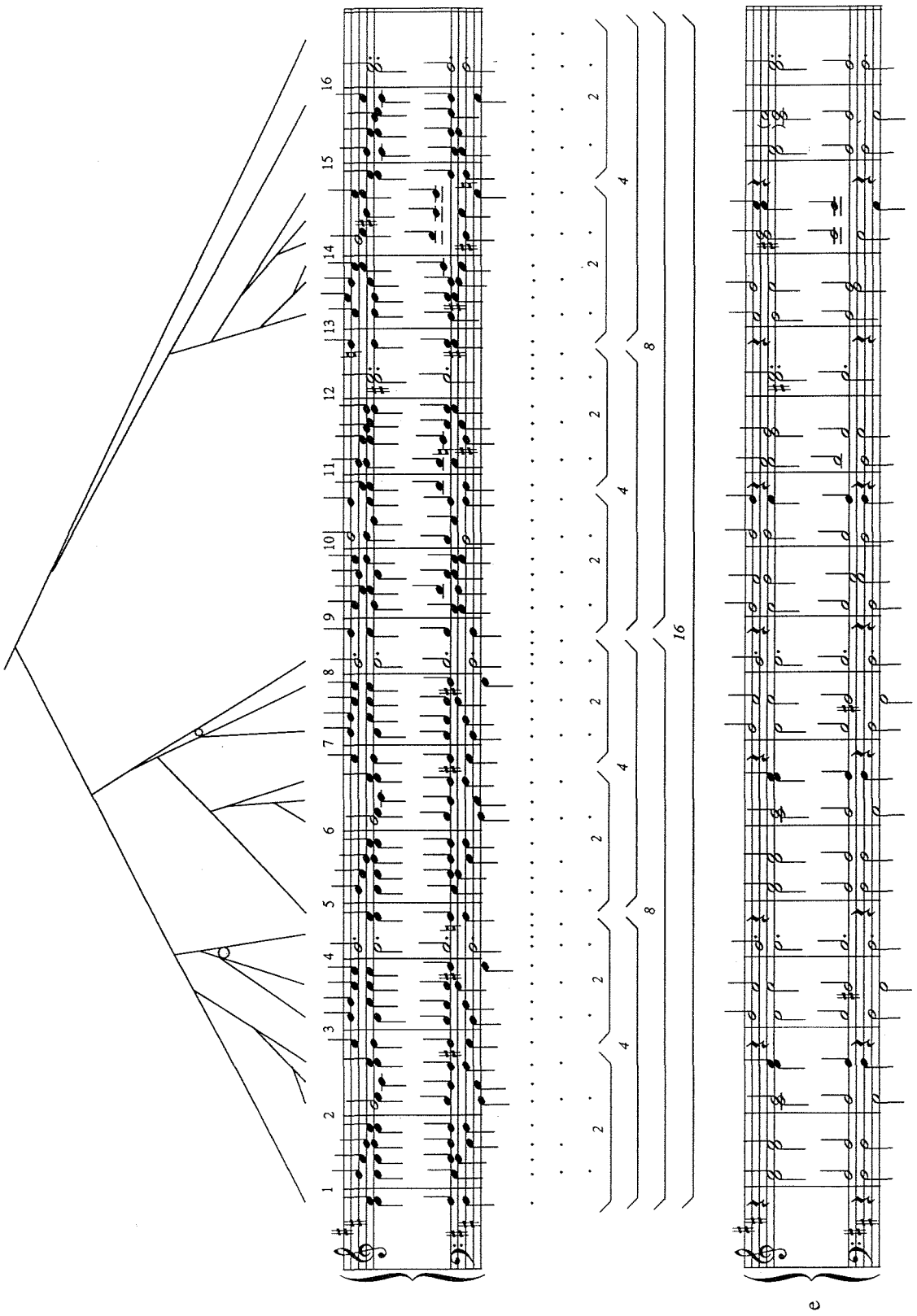
In theory, Lerdahl and Jackendoff's approach accounts for hierarchical structures as well as the systemic relations among pitch-events. In practice, however, they tend to emphasize relations only among adjacent pitches and fail to develop consistency with regard to the status of pitches in broader gestures and, implicitly, their contexts. Example 1 shows the higher levels of Lerdahl and Jackendoff's time-span analysis of Bach's "O Haupt Voll Blut und Wunden."[17] Dots indicate points of metrical emphasis (the more dots, the more emphasis), while angled brackets demarcate rhythmic groupings. The reduction on the bottom system shows a neighbor motion F♯4-E4-F♯4 in mm. 1-2 and a passing motion D5-C♯5-B4 in mm. 3-4. Because the music of mm. 1-4 is heard again in mm. 5-8, one would expect to find the same patterns of prominence and subordinance in both places and hence similar tree structures. Indeed, the trees are similar, but not identical. Unlike the beginning of the piece, the head of the neighbor motion F♯4-E4-F♯4 in mm. 5-6 connects to the cadential C♯5-B4 in m. 7, indicating that the events of the neighbor motion are subordinate to the cadence.[18] Thus, while Lerdahl and Jackendoff's analysis does preserve the autonomy of the neighbor-note gesture in mm. 5-6, it unnecessarily consigns a subordinate role to F♯4 even though F♯4 remains the principal event throughout the first eight measures of the piece. In addition, the analysis relegates D5, occurring on the downbeats of mm. 3 and 7, to

---

[17]Lerdahl and Jackendoff, Ex. 6.25, 144. Lerdahl and Jackendoff differentiate between time-span trees such as those used in this analysis and prolongational trees. Time-span and prolongational analyses are similar in that time-span trees resemble prolongational trees in every way except the addition of circles at the junction of branches. In some sense, time-span trees are also prolongational since the principal events of time-spans are prolonged throughout the time-span they dominate.

[18]Lerdahl and Jackendoff treat cadences as unified structures consisting of two members; the branches of these members are connected by an egg-shaped circle. In this example, the two-member cadence consists of C♯ and B with D being subordinate to both. See *A Generative Theory of Tonal Music*, 138-39.

Example 1. "O Haupt Voll Blut und Wunden," Tree Analysis



a subordinate position even though it is emphasized rhythmically, metrically, and as a member of the local B-minor tonic. In essence, then, Lerdahl and Jackendoff ignore the passing gesture D5-C♯5-B4 in order to emphasize the C♯5-B4 cadence. Lerdahl and Jackendoff also assign more weight to D5, occurring on the third beat of m. 13, than to C♯5, occurring on the fourth beat, because they view D as the tonic of the piece. In this analysis, D5 receives more emphasis even though C♯5 begins a group on the downbeat of m. 13 and ends the same group in m. 14 following its lower neighbor, B, characteristics that would seem to give C♯ more stability than D in these measures. In general, Lerdahl and Jackendoff do not account for changes in pitch relations from group to group and, by implication, from context to context. Such changes can not help but affect the hierarchical significance of certain pitches in the piece.

Lerdahl and Jackendoff's analysis adequately reflects some of the cognitive intuitions of listeners, but does not account for the way pitches group into gestures. This is because Lerdahl and Jackendoff tend to emphasize pairs of adjacent pitches and often disregard relations among larger groups.[19] Such an approach has the effect of prioritizing certain pitches without taking into account their prominent or subordinate roles in schematic gestures. That Lerdahl and Jackendoff themselves hear such gestures is demonstrated by the way the branches

---

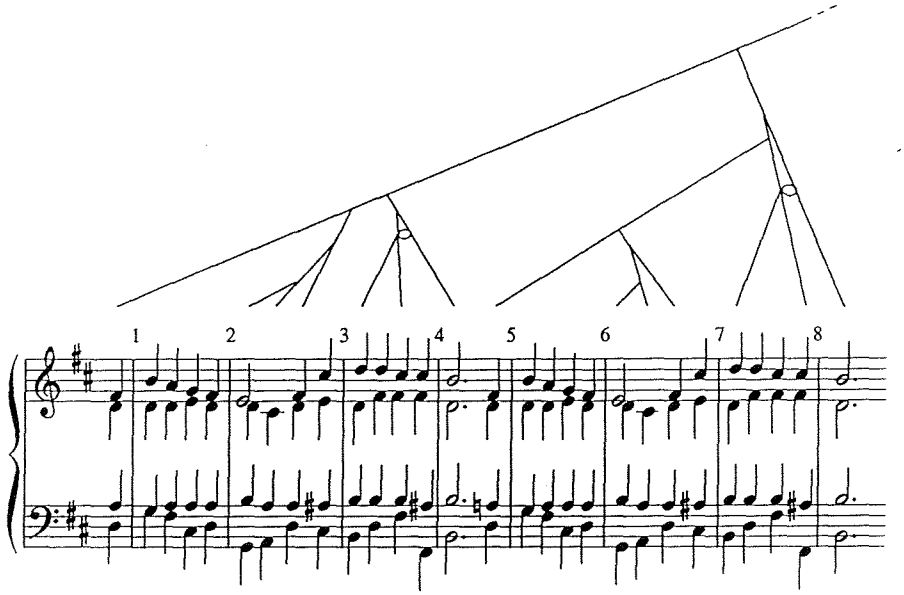
[19]This approach produces an awkwardness in Lerdahl and Jackendoff's analyses that has been noted by others. Edwin Hantz, for instance, points out that trees give a faulty impression of intuition because "branching only occurs in one direction" and because "every span must have a single head." See Hantz, review of "A Generative Theory of Tonal Music," by Fred Lerdahl and Ray Jackendoff, in *Music Theory Spectrum* 7 (1985): 197. John Peel and Wayne Slawson take a similar position when they state that "every structure is shown as subordinate to a single other structure. . . . [P]assing notes, for example, are assigned to either their predecessors or their consequents but not to both." See Peel and Slawson, review of "A Generative Theory of Tonal Music," by Fred Lerdahl and Ray Jackendoff, in *Journal of Music Theory*, 28, no. 2 (1983): 273. I have continued to use trees in my analyses because they provide a clear representation of hierarchical relations. Combining trees with schematic gestures, while more restrictive in some ways, allows for complex kinds of organization, where pitch-events are interpreted not in light of a single other pitch-event, but in light of the schematic gesture to which they belong.

of some gestures in their analyses converge to form separate trees. In Example 2a, the neighbor-note gesture in m. 2 has a main limb that gradually spreads into a canopy of branches whose events are the foreground elaborations of the head. This limb connects to the large-scale head whose principal event is the opening F♯4 anacrusis. Other such limbs emerge in the passage as well. For instance, the heads of the C♯5-B4 cadential structure and the passing-note gesture in mm. 3-4 also connect to the large-scale head producing the effect of a main trunk with only a few limbs, each of which terminates in a profusion of branches. Example 2b shows the series of chained tree structures that would emerge in mm. 1-8 of "O Haupt voll Blut und Wunden" if every gesture in the passage acquired a discrete tree with its main limb, or head, connecting to the trunk. This analysis preserves the autonomy of the various gestures in the excerpt and allows each gesture to develop according to its own patterns of prominence and subordinance. For instance, the passing-note gestures in mm. 3-4 and 7-8 each have one principal event, B4. The other pitch-events in these gestures are subordinate to the head and stem from it. The neighbor-note gestures produce trees that are similar to the passing-note trees because they have similar patterns of prominence and subordinance.[20]

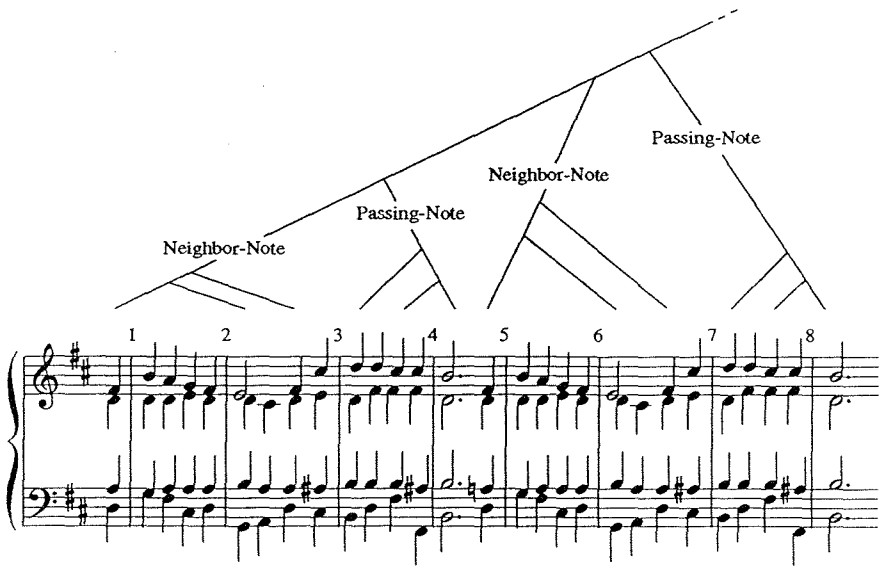
Although prolongation coincides with some aspects of musical perception, the assignment of all pitches in a piece to a hierarchical level seems less intuitive. Yet, such an approach is taken by Lerdahl and Jackendoff (as well as by Schenker). To further illustrate my reservations regarding the assignment of pitches to specific levels, I will again refer to Lerdahl and Jackendoff's analysis of "O Haupt Voll Blut und Wunden," shown in Example 1. In their analysis, Lerdahl and Jackendoff assign all but the surface pitches to one level or another and label these levels with small letters. The notated version of level e appears on the bottom system below the grouping structure in the

[20]In order to reflect the similarity among schemas of some class, be it passing-note, neighbor-note, or any other schema, I will depart from Lerdahl and Jackendoff's usage by constructing trees so that the prominent and subordinate relations of the gestures in each class are always diagrammed in the same way, indicating that all such gestures are cognitively alike and that listeners therefore interpret them as equivalent schemas.

Example 2a. "O Haupt Voll Blut und Wunden," Tree Analysis, mm. 1-8

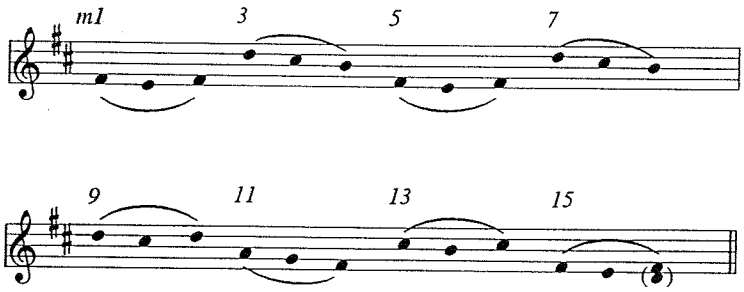


Example 2b. "O Haupt Voll Blut und Wunden," Tree Outlining Schematic Gestures, mm. 1-8



example. Level e outlines the two F♯4-E4-F♯4 neighbor motions, occurring in mm. 1-2 and 5-6, along with each of the D5-C♯5-B4 passing motions, occurring in mm. 3-4 and 7-8. Lerdahl and Jackendoff give no reason for assigning these events to level e, though the analysis does seem plausible. I attribute this to the fact that the pitches on level e organize themselves into schematic gestures, namely neighbor-note and passing-note gestures. These appear in Example 3, which shows Lerdahl and Jackendoff's gestural interpretation of level e.[21] It seems to me that the interpretation sketched in Example 3 comes about not so much because the notes in the sketch occur on a particular level, but because they form parts of certain melodic gestures. Little is gained, then, by additionally assigning these notes to a level in a hierarchy that spans the entire piece.

Example 3. "O Haupt Voll Blut und Wunden," Gestural Analysis



[21]Lerdahl and Jackendoff, 145.

This discussion suggests that one way to reconcile prolongation with the changing hierarchical status of pitches is to abandon analysis in which pitches are interpreted according to one all-encompassing hierarchy and adopt an approach that groups pitches into melodic gestures within whose boundaries certain hierarchical relations emerge. The melodic schemas we construct in music include neighbor-note gestures and passing-note gestures, such as those in "O Haupt Voll Blut und Wunden," as well as changing-note melodies, axial melodies, and triadic melodies.[22] Among the most prevalent features of such schemas is their contour; that is, the rising and falling patterns among their pitches.[23] In tonal music, contours are usually outlined by steps or triadic intervals. Stepwise movement is perceptually salient, at least in part, because many of us tend to associate pitches that are near each other in pitch space.[24] Triadic intervals, on the other hand, are meaningful due to their special function as harmonic intervals in tonal music. Melodic schemas, then, consist of groups of pitches, which follow a certain contour and which move either conjunctly or in leaps defined by triadic intervals. I will make one further distinction by not-

---

[22]See footnote 1.

[23]That melodic contour is one of the most accessible attributes in music has been demonstrated experimentally by a number of researchers including Judy Edworthy, "Melodic Contour and Musical Structure," in *Musical Structure and Cognition,* eds. Peter Howell, Ian Cross, and Robert West (London: Academic Press, 1985), 169-188; W. Jay Dowling, "Melodic Information Processing and its Development," in *The Psychology of Music*, ed. Diana Deutsch (New York: Academic Press, 1982), 413-429; idem, "Recognition of Melodic Transformations: Inversion, Retrograde and Retrograde Inversion," *Perception and Psychophysics* 12, no. 5 (1972): 417-21; and Diana Deutsch, "Delayed Pitch Comparisons and the Principle of Proximity," *Perception and Psychophysics* 23, no. 3 (1978): 227-30.

[24]Recognition of this phenomenon is based not only on intuition, but also on the work of Albert Bregman in "The Formation of Auditory Streams," in *Attention and Performance VII*, ed. J. Requin (Hillsdale, NJ: Erlbaum, 1978), 63-75, as well as Albert Bregman and Jeffrey Campbell in "Primary Auditory Stream Segregation and Perception of Order in Rapid Sequence of Tones," *Journal of Experimental Psychology* 89, no. 2 (1971): 244-49.

ing that melodic gestures can be divided into two categories: those whose pitches receive harmonic support and those whose pitches do not. In this paper, I will confine my discussion to gestures of the former type, referring to them as "melodic schemas."

Multiple Hierarchical Analysis

In multiple hierarchies, each schematic gesture constitutes a context within which patterns of prominence and subordinance—and therefore hierarchical relations—inhere; a schematic event dominates the time-span that contains it but has either a prominent or subordinate relation to other schematic events producing a hierarchy that pertains specifically to the pitch-events of the schema. In other words, each schema generates its own hierarchy. Just as there are multiple schematic contexts, then, there are also multiple hierarchies.

In my analysis of Example 2b, I treated each schematic context independently, as in a network.[25] At the same time, I used trees to represent the hierarchical arrangement of pitches within each schema. Such a method illustrates how a listener's interpretation of a pitch within one context is separate from (but not necessarily incompatible with) the interpretation of that pitch in other schematic contexts. In other words, a single pitch can be interpreted as a part of two different

---

[25]Wallace Berry advocates a network approach to music analysis in his article, "On Structural Levels in Music," 29-30. Robert Gjerdingen takes a similar approach in his book, *A Classic Turn of Phrase*, 27. Network analyses single out various musical structures in a passage and treat each one as a distinct musical structure. Presumably, prominent and subordinate relations remain constant within each network structure. As I have noted, such relations are tree-like. It is for this reason that Robert Gjerdingen asserts that "whereas anything represented in a tree-structure can be incorporated in a network, the reverse is not true" (27). Hierarchical relations, that is, relations based on prominence and subordinance of pitch-events, however, are only implicit in networks and do not show up in the analyses. Networks are useful in that they can account for a wide variety of interpretations, interpretations that a listener may incur upon different hearings of a composition. In addition, they allow pitches to take on different hierarchical roles depending on the context in which the listener interprets them. In spite of these advantages, networks make it easy to ignore hierarchical relations and encourage the analyst to revise the context for each network unit.

schemas, one of which is nested within the other. Each schema in this paradigm, however, maintains its own autonomy and manifests its own hierarchical relations. Example 4 shows a multiple hierarchical analysis of mm. 6-10 of "Liebesbotschaft" from Schubert's "Schwanengesang."[26] Schemas along with their trees appear above the excerpt in boxes. Because each schema resides within its own context, each box symbolizes one context and one set of hierarchical relations. In the first passing-note box B is the most prominent event followed by C and A respectively in each of the next two boxes. The changing-note box reflects how the listener groups some of the prominent events in the passing-note schemas into a gesture whose context and hierarchy traverse all five measures.[27] In constructing the changing-note schema, the listener associates certain events from the passing-note schemas. Such perceptions can occur without disturbing the structural integrity of the passing-note schemas.

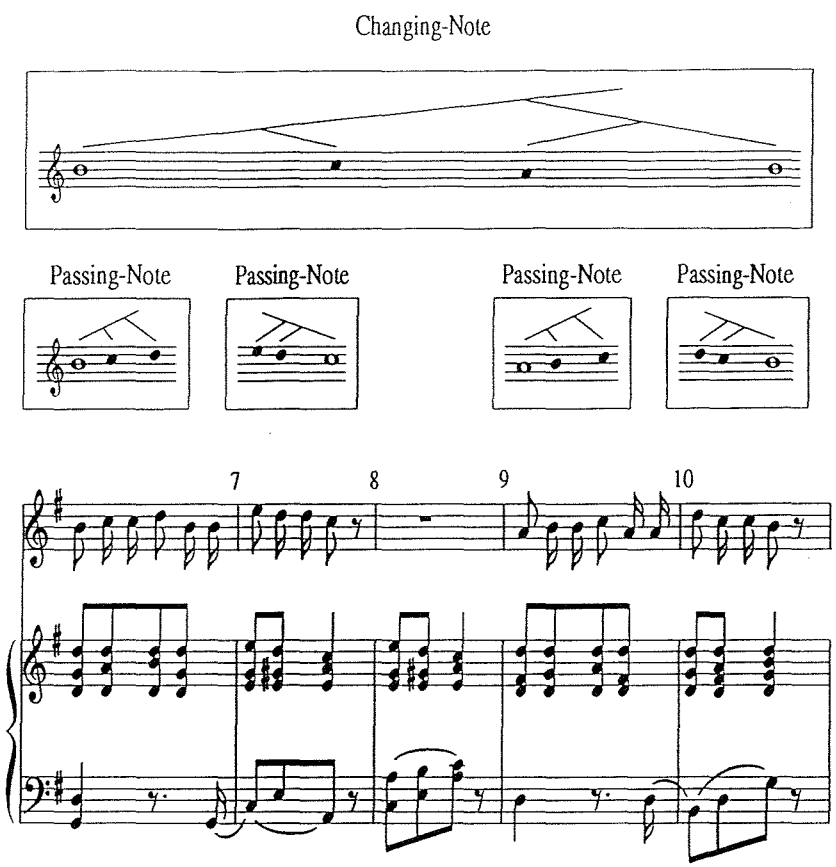
Each box in Example 4 contains a complete schematic gesture illustrating that each schema constitutes a closed context within which its internal hierarchical relations—and *only* its hierarchical relations—inhere. This type of analysis accounts for hierarchical relations among pitches without assigning pitches to a level in a theoretical hierarchy that remains in effect for the duration of a piece. Each schema defines its own hierarchy. Thus, nested schemas maintain their separate hierarchies within the hierarchies of the more global schemas that nest them.

---

[26]In this analysis of "Liebesbotschaft," I will concentrate primarily on the vocal part. To the extent that the piano accompaniment influences the listener's interpretation, as it surely must, I will discuss it as well.

[27]Changing-note schemas are discussed by Leonard B. Meyer in *Explaining Music: Essays and Explorations*, 191. As I have noted in my dissertation, "Trees and Schemas: A Cognitive Approach to Music Analysis" (Ph.D. diss., University of Wisconsin, 1993), 25, such schemas conform to either a "step-down/leap-up/step-down" contour or a "step-up/leap-down/step-up" contour, what Gjerdingen calls an "S-like contour" in *A Classic Turn of Phrase*, 55. The tree generated by the changing-note schema illustrates that the middle two pitch-events are each subordinate to the first and last pitch-events of the schema.

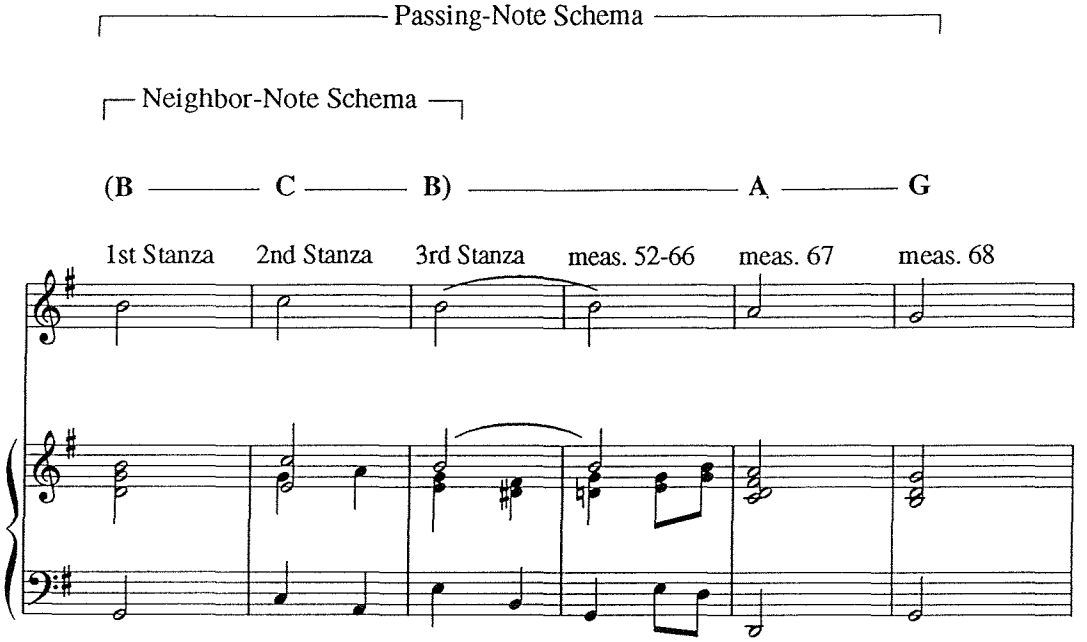
Example 4. "Liebesbotschaft," Multiple Hierarchical Analysis, mm. 6-10



Not all schemas occur on the musical surface. Rather, schemas occur within time-spans of different lengths and are distributed throughout a composition by means of chaining and nesting. As the number of schemas in a piece increases, long-range schematic profiles often begin to emerge. Example 5 shows how a passing-note schema with a nested neighbor-note schema emerges within a time-span that covers nearly the entire duration of "Liebesbotschaft." All other schemas within this span serve to elaborate the events of these long-range schemas.[28]

[28]The rhythm of Example 5 does not correspond to the large-scale metrical structure of "Liebesbotschaft." Nor does the right hand follow Schubert's usage. Rather, I have adopted reductive criteria in this example and those that follow in order to illustrate the

Example 5. "Liebesbotschaft," Large-Scale Schemas



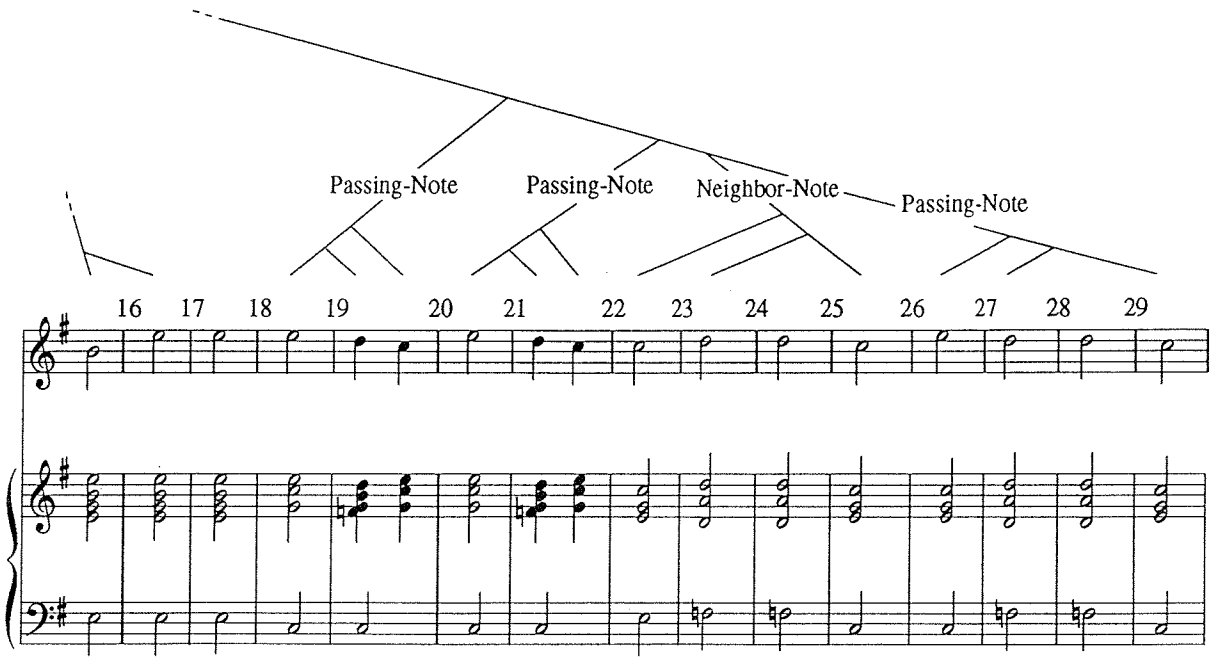
In order to show how the large-scale schemas shown in Example 5 develop in the song, I will first provide a schematic tree analysis of the remainder of "Liebesbotschaft" and then show how the schemas in each of the song's principal sections elaborate the principal events of schemas that emerge within very broad time-spans. As we have seen, B4 is the most prominent pitch at the beginning of the first stanza, but starting in m. 15 (and continuing through the second stanza) B4's

---

large-scale schemas in the song. Furthermore, though I use half notes, quarter notes, and eighth notes to indicate basic melodic events in the example, I will not be using them to make any specific claims about the metrical organization of "Liebesbotschaft" beyond the location of large downbeats at the beginning of each stanza, where the barlines occur in the example.

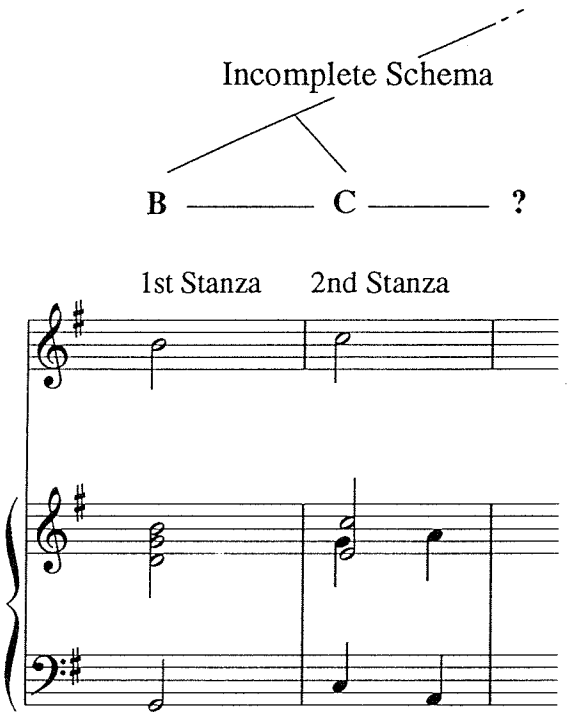
prominence is challenged. Example 6 shows a schema/tree analysis of mm. 15-29 of "Liebesbotschaft" in which the accompanimental arpeggiations have been rewritten as block chords. E5 enters abruptly in m. 16 following a leap from B4. This has the effect of leaving B4 awaiting continuation as the first stanza ends. E5 begins the second stanza in m. 18 and, following several nested passing-note gestures and a neighbor-note gesture, E5 descends to C5 in m. 29. Because it ends the stanza cadentially and because it is prepared so relentlessly by each of the chained schemas, C5 emerges with the most prominence in the passage. Its prominence is further enhanced by the fact that it forms a conjunct melodic continuation with the B4 left hanging in m. 15.

Example 6. "Liebesbotschaft," Tree Analysis of the Second Stanza



Example 7 shows how B4, the most prominent pitch in the first stanza (spanning mm. 6-17), connects to C5, the most prominent pitch in the second stanza (spanning mm. 18-32). Together, these pitches constitute an incomplete neighbor or passing motion. The listener therefore anticipates the song's inevitable continuation.

Example 7. "Liebesbotschaft," Incomplete Neighbor Motion B-C

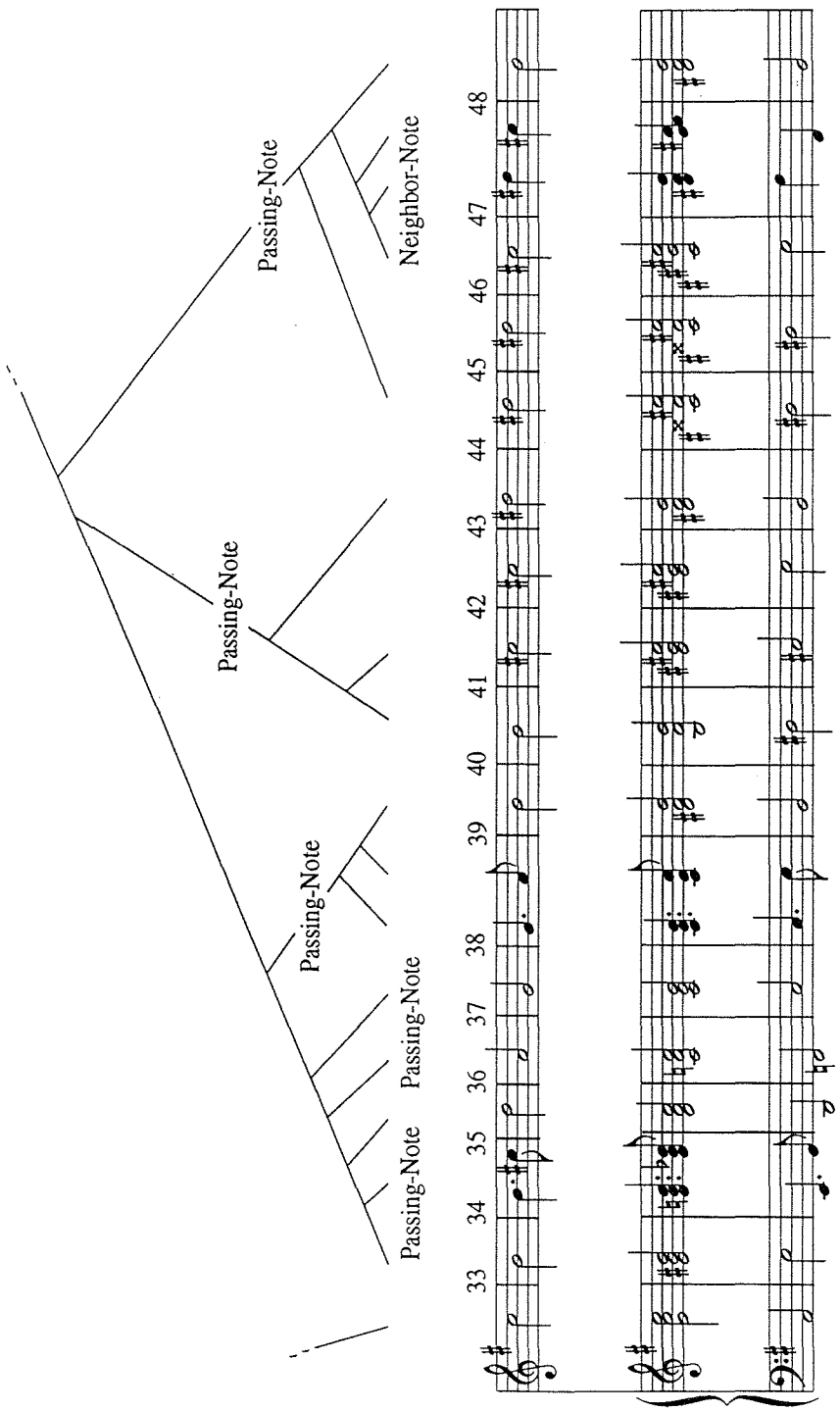


The music of the third stanza, which begins in m. 32, is less stable than the music of the other stanzas in the song, largely because a number of different pitches serve briefly as tonics. In spite of this flight from tonal stability, one pitch-event, B4, emerges with the most salience, a not so unlikely occurrence given the incomplete B-C

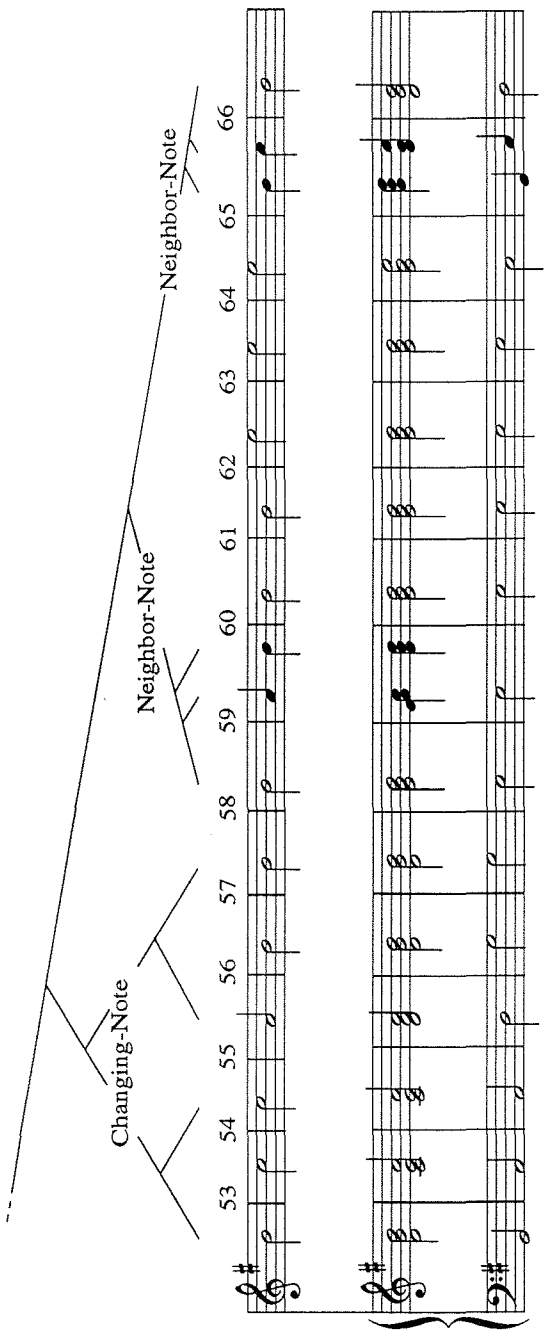
neighbor motion articulated in the first two stanzas. Example 8 shows the tree configuration of this passage. As in Example 6, the analysis replaces the accompanimental arpeggiations with block chords. While C5 carries over from the second stanza into m. 32, it quickly descends to B4 in m. 33, which emerges as the most prominent event in the remainder of the third stanza. In m. 34, there is a passing motion that connects B4 with another chord note, D5. B4 continues to dominate through m. 35 where it moves to A4 and then to G♯4, completing another passing motion. A third passing motion occurs in mm. 38-39 that has B4 as its goal. Two more passing motions occur in the passage: the first ascends from B4 in m. 40 through C♯5 in m. 41 to D♯5 in m. 43, the second begins with D♯ in m. 44 and is elaborated by a nested neighbor-note schema D♯5-C♯5-D♯5 before descending through C♯5 to B4. Because B4 begins and ends the passage and is the head of each passing-note schema, it emerges as the most prominent pitch in mm. 33-48.

With B4 emerging as the most prominent pitch in the third stanza, the global neighbor-note schema B4-C5-B4 reaches its completion. As I have noted, however, a number of different tonics occur in the third stanza of "Liebesbotschaft," so that the arrival of B4 in the third stanza provides a rather tenuous conclusion for the large-scale neighbor-note schema. In the fourth stanza, G major is reestablished as the tonic, where it underlies the same changing-note schema that was first articulated in mm. 6-10 (refer again to Example 4). Occurring so prominently at the beginning and end of the song, the changing-note schema serves as a musical metaphor for the "Liebesbotschaft," carried along on a cognitive "Bächlein," so to speak, to the poet's beloved at the end of the song. Example 9 shows a tree analysis of mm. 52-66 of the fourth stanza. This analysis is similar to that in Examples 4 and 6. Like Example 4, the fourth stanza begins with a B4-C5:A4-B4 changing-note schema. B4 leaps to E5 in m. 62 just as it did in m. 16, only this time it leaps back almost immediately to B4 in m. 65. Thus, while B4 was left awaiting continuation in the first stanza, it remains the most prominent pitch throughout mm. 52-66 of the final stanza.

Example 8. ''Liebesbotschaft,'' Tree Analysis of the Third Stanza

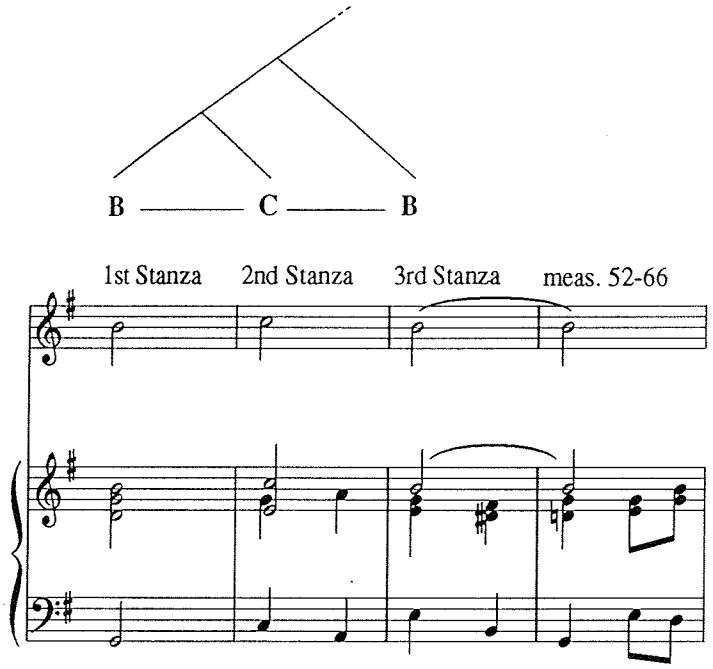


Example 9. "Liebesbotschaft," Tree Analysis of the Fourth Stanza



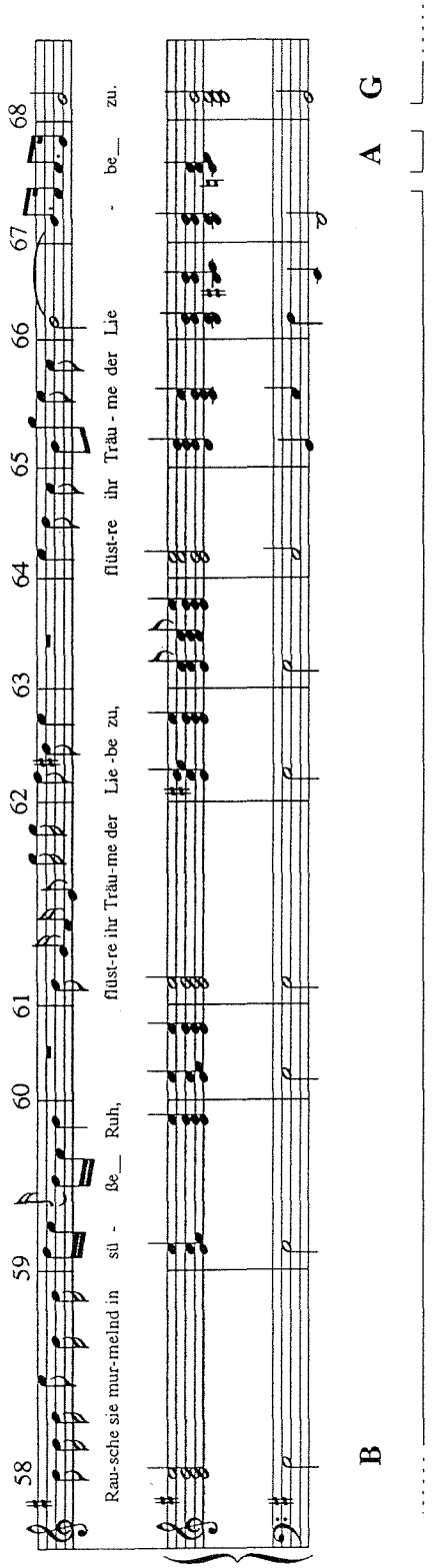
In spite of the fact that "Liebesbotschaft" has four stanzas, only three pitches emerge with global prominence: B4 in mm. 6-17, C5 in mm. 18-32, and B4 in mm. 33-66. These pitch-events combine to form a broad neighbor-note schema that spans most of the song. Example 10 shows this neighbor motion along with its tree.

Example 10. "Liebesbotschaft," Neighbor-Note Schema Spanning mm. 6-66



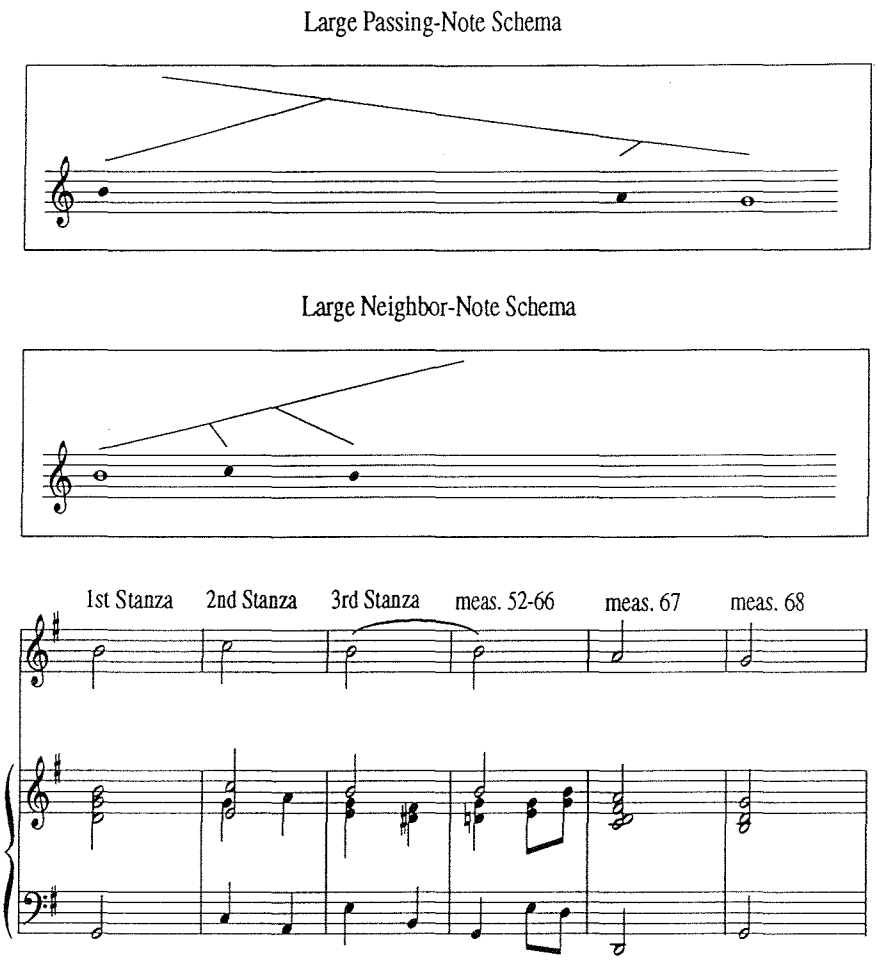
While the completion of the global neighbor-note schema in "Liebesbotschaft" provides some sense of closure, other aspects of the music suggest that there is more to come. Example 11 shows the final measures of the fourth stanza. In mm. 58-62, B4 is accompanied by an E-minor tonic rather than the original G-major tonic. A more secure ending occurs with the final line of the song in mm. 64-68. Here the poet repeats the lyrics of the last phrase, "flüstre ihr Träume der Liebe zu," as if to lull his beloved to sleep. The melody reflects the descent into slumber by moving downward from E5 to B4 in mm. 64-65 and finally from B4 through A4 to G4 in mm. 65-68

Example 11. "Liebesbotschaft," Conclusion of the Fourth Stanza



Since B4 is the principal event of the neighbor-note schema that spans mm. 6-66, the inclusion of mm. 67-68 has the effect of embedding the neighbor-note schema in a passing-note schema that spans mm. 6-68. Example 12 shows a multiple hierarchical analysis of "Liebesbotschaft" that includes mm. 67-68 of the fourth stanza. In these final measures, the melody moves suddenly and incisively from A4 to G4, above I, thus completing a passing-note schema, B4-A4-G4, that nests the large-scale neighbor motion.

Example 12. "Liebesbotschaft," Multiple Hierarchical Analysis, mm. 6-68



This analysis suggests that B4 dominates the time-span that traverses mm. 6-66, yet by m. 9, B4 has already been relegated to a subordinate position within a passing-note schema (cf. Example 4). In this case, local relations override broader associations. This does not change the fact that a listener might construct the neighbor-note schema B4-C5-B4 across mm. 6-66 or a passing-note gesture across mm. 6-68. It does suggest, however, that each schema unfolds according to its own unique hierarchy.

A better description of how a listener associates B4 with C5 in the neighbor-note schema that emerges over mm. 6-66 as well as with A4 and G4 in the passing-note schema that traverses mm. 6-68 comes about, once again, through the consideration of contextual matters. B4 is imbued with a unique hierarchical status within each schematic context. Since hierarchical relations inhere only within the confines of each schematic context, the significance of B4 is limited to its specific context. Hence, B4 in m. 9 has a subordinate status only with regard to the passing-note schema that contains it. It carries none of this meaning to its interpretation as part of the changing-note schema. The passing-note schema in m. 9 is a complete gesture in and of itself. But the passing-note schema does not account for all of the contextual pressures in the passage. In mm. 6-7, for instance, the listener hears a stepwise ascent from B4 to C5. In this context, C5 is subordinate to B4, so that the listener expects C5 to return to B4, a resolution that does not occur until m. 10. Like the passing-note schema, the hierarchical relations among the pitches in the changing-note schema remain in effect until the gesture ends even though in this case the schema spans a broader time-span. Thus, B4 remains prominent throughout the changing-note schema. This prominence is only perceived within the changing-note context, however, and does not affect the perception of B4 as a subordinate pitch in the passing-note schema in m. 9.

The point of this discussion is to show that *pitches* are not as crucial as the *relations* between them, relations which depend on context. A listener focuses not so much on "Bness" or "Cness" in either the passing-note schema in m. 9 or even the changing-note schema in mm. 6-10 for that matter, but rather on the patterns of prominence and

subordinance in each schema, patterns that are merely *represented* by the pitches. Hence, when an incomplete gesture such as B-C:A-? occurs, the listener expects the gesture to continue and awaits its outcome. On the other hand, when the passing-note schema A-B-C occurs, the listener—realizing that the gesture is complete—is able to close the file on it, so to speak, because no further resolution is necessary to complete the gesture. This suggests that a gesture remains active—not fully analyzed—until its outcome occurs.[29] In other words, *it is the fact that a note remains unresolved that a listener retains in memory, not the note itself.* In this view, the notes of the changing-note schema in mm. 6-10 of "Liebesbotschaft" remain active until m. 10 where an outcome occurs. Thus, the listener hears an unresolved gesture and awaits its resolution, at which point he or she is able to close the file on that gesture. B4, it turns out, is the most prominent pitch in the gesture, but B4 is in the service of prominence and subordinance throughout the gesture in that it represents the points of departure and arrival in the changing-note schema.

Overall, there is perhaps little about my analysis of "Liebesbotschaft" that is incompatible with a traditional Schenkerian analysis. Schenker would view the passing-note schema that spans mm. 6-68 in "Liebesbotschaft" as an *Ursatz.* I prefer to view it from a different perspective, namely that Schenker's *Ursatz* is an example of a schema. Schenker, of course, would most certainly object to this view of his work. After all, for Schenker, there is only one *Ursatz* in each composition. Thus, in the Schenkerian approach, the descending $\hat{3}$-$\hat{2}$-$\hat{1}$ *Ursatz* in "Liebesbotschaft" has a different status than the passing-note gestures that emerge at other levels. In other words, in Schenker's view the *Ursatz* can not be equated taxonomically with other schemas whose purpose is to elaborate it. Such a view comes about because Schenker

---

[29]The results of my study, "Differences in Listening Comprehension with Tonal and Atonal Background Music," *Journal of Music Therapy* 26, no. 4 (1987): 188-197, indicated that listeners in the study were distracted more by tonal music than by atonal music when performing a reading comprehension task. One explanation for these results is that the subjects in the study attended more to tonal music because they were awaiting outcomes whereas they found the nontonal music less predictable and consequently easier to ignore.

develops his ideas around pitches rather than gestures. Thus, while he recognizes gestures such as the passing-motion, he can only do so within the admittedly powerful framework of the *Ursatz*.

The multiple hierarchical approach to analysis I am advocating provides insight, I believe, into the cognitive aspects of prolongation while preserving the basic tenets of Schenker's theory. Both methods group pitches that occur over time into structures that are analyzed out of time. In addition, each method takes into account the propensity of listeners to construct music in terms of melodic gestures. The hierarchical or tree-like nature of these gestures is recognized by Schenker and others—such as Lerdahl and Jackendoff—who advocate a generative approach to musical analysis. Taken independently, neither schemas nor trees provide a complete picture of cognition. Nor can level analysis completely explain the phenomenon of prolongation. Rather, all such criteria exert their collective cognitive influence in our interpretation of music. Combining trees with schemas reflects our propensity to construct music both gesturally and hierarchically and shows how other perceptions, such as prolongation, might merge with these musical cognitions.